

Cutting speed recommendations

The recommendations are valid for use with cutting fluid.

ISO	CMC No.	Material	Specific cutting force k_c 0.4 N/mm ²	Hardness Brinell HB	<<<< WEAR RESISTANCE		
					GC3115	GC4225	GC4025
					h_{ex} , mm \approx feed f_m , mm/r		
					Cutting speed (v_c), m/min		
P	01.1 01.2 01.3	Unalloyed C = 0.1–0.25% C = 0.25–0.55% C = 0.55–0.80%	2000	125	355-185	340-180	325-175
			2100	150	330-140	315-140	300-135
			2200	170	300-125	290-120	280-120
	02.1 02.2 02.2	Low-alloy $\leq 5\%$ Non-hardened Hardened and tempered Hardened and tempered	2150	180	290-135	280-130	270-125
			2550	275	270-105	265-100	260-95
			2850	350	220-85	215-80	210-75
	03.11 03.21	High-alloy $> 5\%$ Annealed Hardened tool steel	2500	200	260-115	255-105	250-105
			3900	325	205-75	195-75	185-70
	06.1 06.2 06.3 06.33	Castings Unalloyed Low-alloy (alloying elements $\leq 5\%$) High-alloy (alloying elements $> 5\%$) Manganese steel, 12–14% Mn	2000	180	175-75	165-70	160-65
			2100	200	200-90	190-85	180-80
			2650	225	160-75	130-95	100-75
			3600	250	90-50	85-45	80-40
ISO	CMC No.	Material	Specific cutting force k_c 0.4 N/mm ²	Hardness Brinell HB	<<<< WEAR RESISTANCE		
					GC1005	GC1105	H13A
					h_{ex} , mm \approx feed f_m , mm/r		
					Cutting speed (v_c), m/min		
M	05.11 05.12 05.13	Ferritic/martensitic Bars/forged Non-hardened PH-hardened Hardened	2300	200	400-175	400-175	90-70
			3550	330	215-95	215-95	60-40
			2850	330	255-110	255-110	70-50
	05.21 05.22 05.23	Austenitic Bars/forged Austenitic PH-hardened Super austenitic	2300	180	435-190	435-190	100-65
			3550	330	235-100	235-100	50-33
			2950	200	260-115	260-115	65-45
	05.51 05.52	Austenitic-ferritic (Duplex) Bars/forged Weldable $< 0.05\%C$	2550	230	335-145	335-145	-
			3050	260	300-130	300-130	-
	15.11 15.13 15.21 15.22	Ferritic/martensitic Cast Non-hardened Hardened	2100	200	-	-	75-60
			2650	330	-	-	50-38
		Austenitic Cast Austenitic PH-hardened	2200	180	-	-	70-45
			3150	330	-	-	45-29
		Austenitic-ferritic (Duplex) Cast					
15.51 15.52	Non-weldable $\geq 0.05\%C$ Weldable $< 0.05\%C$	2250 2750	230 260	- -	- -	- -	

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General Information

TOUGHNESS >>>>						
GC1025	GC4125	GC2135	GC2145	GC235		
0.05-0.5	0.05-0.5	0.05-0.5	0.05-0.5	0.05-0.5		
235-115 210-90 185-85	255-125 230-100 205-90	205-100 180-75 175-70	175-90 160-65 150-60	165-130 150-120 140-105		
185-85 165-75 135-60	205-95 175-80 140-65	175-80 155-70 125-55	155-75 140-60 115-50	140-110 120-85 95-70		
170-75 120-50	180-80 130-55	155-70 105-45	140-65 95-37	70-60 45-33		
110-55 130-65 80-45 55-30	120-60 140-75 105-45 60-35	105-50 120-60 90-40 50-29	95-45 110-55 80-35 -	100-70 90-55 80-45 100-80		
TOUGHNESS >>>>						
GC4125	GC1025	GC2135	GC235	GC2145		
0.05-0.5	0.05-0.5	0.05-0.5	0.05-0.5	0.05-0.5		
165-75 130-60 140-65	160-70 120-55 130-55	145-65 110-45 120-50	130-100 90-70 100-75	130-50 110-40 110-45		
185-90 130-60 140-65	175-80 120-55 130-60	165-70 105-50 115-55	125-95 75-55 85-65	140-55 95-45 105-50		
155-75 130-60	145-70 120-55	135-60 110-50	125-95 95-70	125-50 100-45		
150-70 125-55	140-65 120-50	130-60 110-45	110-85 70-55	120-45 100-40		
160-80 105-55	150-70 95-50	135-60 90-45	105-80 65-50	125-50 80-38		
135-65 110-55	125-60 105-50	115-55 95-45	110-85 85-60	105-45 80-39		

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					H13A		
					h_{ex} , mm \approx feed f_m , mm/r		
					0.05-0.8		
Cutting speed (v_c), m/min							
N Non-ferrous material	30.11 30.12	Aluminium alloys Wrought or wrought and coldworked, non-aging	500	60	1500 (1900 - 190)		
			800	100	1500 (1900 - 190)		
	30.21 30.22	Aluminium alloys Cast, non aging Cast or cast and aged	750	75	1500 (1900 - 190)		
			900	90	1500 (1900 - 190)		
	30.41 30.42	Aluminium alloys Cast, 13-15% Si Cast, 16-22% Si	950	130	400 (500 - 50)		
			950	130	250 (315 - 31)		
	33.1 33.2 33.3	Copper and copper alloys Free cutting alloys, $\geq 1\%$ Pb Brass, leaded bronzes, $\leq 1\%$ Pb Bronze and non-leadad copper incl. electrolytic copper	700	110	350 (440 - 45)		
			700	90	400 (500 - 50)		
			1750	100	250 (315 - 31)		
	ISO	CMC No.	Material	Specific cutting force k_c 0.4 N/mm ²	Hardness Brinell HB	<<<< WEAR RESISTANCE	
GC1005						GC1105	H13A
h_{ex} , mm \approx feed f_m , mm/r							
0.05-0.3							
Cutting speed (v_c), m/min							
S Heat resistant super alloys	20.11 20.12	Iron base Annealed or solution treated Aged or solution treated and aged	3000	200	180-120		
			3050	280	150-100		
	20.21 20.22	Nickel base Annealed or solution treated Aged or solution treated and aged	3300	250	90-55		
			3600	350	80-50		
	20.24	Cast or cast and aged	3700	320	70-45		
			3700	320	70-45		
	20.31 20.32 20.33	Cobalt base Annealed or solution treated Solution treated and aged Cast or cast and aged	3300	200	90-60		
			3700	300	80-50		
			3800	320	70-45		
	E Titanium	23.1 23.21 23.22	Commercial pure (99.5% Ti) Titanium alloys ¹⁾ α , near α and $\alpha+\beta$ alloys, annealed β alloys, annealed or aged	1550	Rm ²⁾ 400	175-145	
1700				950	70-60		
1700				1050	65-55		

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GC4125	GC1025	GC2135	GC2145			
0.05-0.3	0.05-0.3	0.05-0.3	0.05-0.3			
70-38 50-29	60-35 45-28	50-29 40-26	40-30 30-20			
45-28 40-22 30-16	45-28 40-22 30-16	40-26 35-21 25-10	25-20 15-10 15-10			
50-33 40-22 30-16	50-33 40-22 30-16	45-28 35-17 25-14	30-20 20-10 15-10			
200-95	190-95					
70-38 65-33	65-37 60-32					